

Dynamic Underground Stripping Characterization Report

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Introduction

This report combines geological, hydrological, physical, chemical, and biological characterization to validate the success of and determine the effects of the Dynamic Underground Stripping (DUS) process. The characterization activities also provided data (1) to estimate the masses of contaminants present and their spatial distribution before and after the heating and removal processes, (2) to aid in the planning for placement of injection and extraction wells, (3) to provide physical data to develop conceptual models, (4) to validate subsurface imaging techniques, and (5) to confirm regulatory compliance.

Coarse-grained, permeable materials at or below the water table comprise preferential pathways for contaminant transport and steam migration. Consequently, it was important to obtain a clear conceptual model of the lithology of the gasoline spill area before DUS processes were initiated. In the first section of this report on hydrogeologic characterization, cross-sections were constructed based on a comprehensive review of the geologic, borehole geophysical, hydraulic, chemical, and well completion data. This information was used to assist in the design of the DUS well field and steam injection and extraction well completions.

Subsurface characterization depends heavily on drilled boreholes, which can be expensive; therefore, whenever possible individual wells served multiple functions of characterization, operations, and monitoring. During the drilling phase, lithological descriptions of continuous core provided detailed understanding of the vertical distribution of the lithology. Sampling techniques were modified during the post characterization phase to insure data integrity of the hot (80° to 90°C) sediments. Core material retrieved during the drilling operations supplied sediment samples for chemical, biological, and physical analyses, as well as validation of lithology. Aliquots of sediments were characterized for contaminant concentration, microbial profiles, organic content, cation exchange capacity, permeability, porosity, pH, density, and sorption capacity.

Measurements of biological activity at the Clean Site (Bishop, *et. al.*, Dynamic Underground Stripping Project [Clean Site] Characterization Report, 1991) established background numbers and types of organisms indigenous to the area. This will be useful for comparison to numbers and types of microorganisms at the Gasoline Spill (GS) area. Because of the gasoline products in the GS, the microorganisms present there may reflect the selection for microbes that can utilize fuel hydrocarbons (FHCs) as an energy source.

The hydrogeologic, physical and chemical, microbiological, and geochemical characterization reports, as well as the data management report, exist as separate sections in this comprehensive characterization summary. Each section has its own figures, tables and references. The appendices have been combined and are located at the back of the report.

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